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Energy Systems and Basin Analysis Programme

Commissioned Report CR/17/132

BRITISH GEOLOGICAL SURVEY

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J E Thomas

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British Geological Survey offices

BGS Central Enquiries Desk

Tel 0115 936 3143 Fax 0115 936 3276
email enquiries@bgs.ac.uk

Environmental Science Centre, Keyworth, Nottingham NG12 5GG

Tel 0115 936 3241 Fax 0115 936 3488
email sales@bgs.ac.uk

The Lyell Centre, Research Avenue South, Edinburgh EH14 4AP

Tel 0131 667 1000 Fax 0131 668 2683
email scotsales@bgs.ac.uk

Natural History Museum, Cromwell Road, London SW7 5BD

Tel 020 7589 4090 Fax 020 7584 8270
Tel 020 7942 5344/45 email bgslondon@bgs.ac.uk

Cardiff University, Main Building, Park Place, Cardiff CF10 3AT

Tel 029 2167 4280 Fax 029 2052 1963

Maclean Building, Crowmarsh Gifford, Wallingford OX10 8BB

Tel 01491 838800 Fax 01491 692345

Geological Survey of Northern Ireland, Department of Enterprise, Trade & Investment, Dundonald House, Upper Newtownards Road, Ballymiscaw, Belfast, BT4 3SB

Tel 028 9038 8462 Fax 028 9038 8461
www.bgs.ac.uk/gsni/

Parent Body

Natural Environment Research Council, Polaris House, North Star Avenue, Swindon SN2 1EU

Tel 01793 411500 Fax 01793 411501
www.nerc.ac.uk

Website www.bgs.ac.uk
Shop online at www.geologyshop.com

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Summary

As part of Phase 3 of the BGS Faroe-Shetland Consortium project on the Jurassic of the UK sector of the Faroe-Shetland Basin, detailed logging of core from well 202/03-1A was undertaken and samples were taken for palynology in order to provide additional facies information and age determinations. The palynological assemblages are moderately productive and indicate a marine environment. The dinoflagellate cyst assemblages contain a number of taxa with ranges that bracket samples 1 to 5 within the Mid Volgian. The dinoflagellate cyst assemblage in sample 6 indicates Late Jurassic (Kimmeridgian to Mid Volgian) strata (Riding and Thomas, 1992).

1 Introduction

During detailed logging of core from well 202/03-1A, samples were taken for palynology in order to provide additional facies information and age determinations for the lithofacies analysis.

The samples were prepared for palynology using standard acid-based maceration techniques. The residues were mounted onto slides for microscopic examination. The samples, aqueous residues and microscope slides are held in the BGS collections at Keyworth, Nottingham. Sample details are set out in Appendix 1.

2 Palynology

Summary descriptions of all six samples follow. Detailed data is set out in Appendix 2.

2.1 SAMPLES 1 TO 5 (1643.75 TO 1666.99 M) – MID VOLGIAN

These five samples produced residues dominated by abundant brown wood and plant material (86–93%) with much smaller amounts of amorphous organic material (AOM), black wood and palynomorphs. Marine palynomorphs are present throughout indicating a marine environment. In sample 1 (1643.75 m) occasional dinoflagellate cysts are present including *Cribroperidinium globatum, Prolixosphaeridium anasillum* and *Tubotuberella apatela* indicating a Late Jurassic age no younger than Mid Volgian (Riding and Thomas, 1992). In sample 2 (1647.3 m), the dinoflagellate cysts *Cribroperidinium globatum, Cyclonephelium hystrix, Perisseiasphaeridium insolitum, Systematophora areolata* and a possible *Senoniasphaera jurassica* indicate an Early to Mid Volgian age. Similarly, in samples 3 and 4(1650.58 and 1663.19 m), the dinoflagellate cysts *Cyclonephelium hystrix, Cribroperidinium globatum, Gonyaulacysta* sp. A, and *Systematophora* sp with possible specimens of *Ctenidodinium* sp. and *Senoniasphaera jurassica* indicate a Kimmeridgian to Mid Volgian age. Sample 5 (1666.99 m) yielded a dinoflagellate cyst assemblage including *Cyclonephelium hystrix, Gonyaulacysta* sp. A, *Kallosphaeridium* sp. *Prolixosphaeridium anasillum, Perisseiasphaeridium insolitum* and *Systematophora areolata*. Together they indicate an early Mid Volgian age.

The terrestrially derived palynomorph assemblages of this interval are dominated by long-ranging taxa typical of the Late Jurassic but of little help in subdividing the interval. Most numerous are bisaccate pollen and *Perinopollenites elatoides.* Also present are the pollen taxa *Araucariacites australis, Callialasporites turbatus, Cerebropollenites macroverrucosus, Chasmatosporites apertus, Classopollis classoides* and *Exesipollenites scabratus* and the spores *Baculatisporites commaumensis, B. wellmanii, Cyathidites minor, Gleicheniidites cirniidites, Densosporites* sp., *Retitriletes austroclavatidites, Staplinisporites caminus* and *Tuberositriletes* sp.

2.2 SAMPLE 6 (1671.21 M) – KIMMERIDGIAN TO MID VOLGIAN

The kerogen assemblage is almost identical to those described above with 12% marine palynomorphs. Dinoflagellate cysts present include *Cyclonephelium hystrix,* indicating Kimmeridgian or younger strata, with questionable specimens of *Ctenidodinium* sp. and *Mendicodinium groenlandicum.*

3 Conclusions

The palynomorph assemblages from this interval in well 202/03-1a were moderately productive with the samples yielding sufficient residue to allow a count of kerogen types. The kerogen assemblages were remarkably consistent in being dominated by brown plant-derived material and with very little amorphous organic material. Taken with the presence of marine palynomorphs in all samples, a nearshore marine environment is indicated.

The pollen and spore assemblages did not contain any age-diagnostic taxa but the dinoflagellate cyst assemblages contained a number of taxa with ranges bracketing samples 1 to 5 within the Mid Volgian.

The dinoflagellate cyst assemblage in sample 6 indicates Late Jurassic (Kimmeridgian to Mid Volgian) strata (Riding and Thomas, 1992).

4 Reference

RIDING, J B, and THOMAS, J E. 1992. Dinoflagellate cysts of the Jurassic System. 7–97 *in*. *A stratigraphic index of dinoflagellate cysts.* POWELL, A J (editor). (London: Chapman and Hall, British Micropalaeontological Society Publications Series.)

Appendix 1 - Sample details (measured depths).

INFORMAL No.	BGS MPA No.	DEPTH (m)	SSK No.
1	67623	1643.75	63877
2	67622	1647.30	63876
3	67621	1650.58	63875
4	67620	1663.19	63874
5	67619	1666.99	63873
6	67618	1671.21	63872

Appendix 2 - Palynology data

Well 202/03-1a						
Number	**1**	**2**	**3**	**4**	**5**	**6**
MPA Number	67623	67622	67621	67620	67619	67618
Depth	1643.75	1647.3	1650.58	1663.19	1666.99	1671.21
Age interpretation	**Mid Volgian**					**Kimm. to M. Volg.**
Palaeoenvironment	**Marine**					
PTERIDOPHYTE SPORES						
Baculatisportites commaumensis	X		X	X		
Baculatisportites wellmanii		X				
Cyathidites mesozoica					X	
Cyathidites minor	X	X	X	X		X
Gleicheniidites cirniidites	X	X	X			
Gleicheniidites sp.						X
Densosporites sp.		X				
Retitriletes austroclavatidites	X	X	X			
Spore - indeterminate				X		X
Staplinisporites caminus		X				
Tuberositriletes sp.	X	X			X	
GYMNOSPERM POLLEN						
Araucariacites australis	X	X	X	X	X	X
Bisaccate pollen undiff.	X	X	X	X	X	X
Callialasporites dampieri					X	
Callialasporites turbatus		X				
Cerebropllenites macroverrucosus	X	X	X	X	X	X
Chasmatosporites apertus	X	X		X		X
Chasmatosporites sp.						X
Classopollis classoides	X	X		X		X
Colpate pollen undiff				X		
Exesipollenites scabratus	X	X	X		X	X
Perinopollenites elatoides	X	X	X	X	X	X
DINOFLAGELLATE CYSTS						
Coronifera sp.		?				
Cribroperidinium globatum	X	X		X	X	
Cribroperidinium sp.		X				
Ctenidodinium sp.			?			?
Cyclonephelium hystrix		X	X	X	X	X
?Egmontodinium sp.		X			X	
Gonyaulacysta sp. A		X		X	X	
Gonyaulacysta sp. B		X				
Kallosphaeridium sp.	?	?			X	
?Mendicodinium groenlandicum						X
Perisseiasphaeridium insolitum		X			X	
Perisseiasphaeridium sp.					?	
Prolixosphaeridium anasillum	X				X	
Prolixosphaeridium sp.		?				
?Senoniasphaera jurassica		X	X			
Systematophora areolata		X			X	
Systematophora sp.				X		
?Subtilisphaera sp.	X					
Tubotuberella apatela	X					
MISCELLANEOUS						
Foraminiferal test lining	X	X	X	X	X	X
Micrhystridium spp.	X		X	X	X	
Prasinophytes sp.					X	
Pterospermella sp.	X	X	X	X	X	
Tasmanites sp.		X				
KEROGEN TYPE PERCENTAGES						
Wood	5	2	3	3	2	4
Plant fragments	86	92	93	93	93	91
Palynomorphs	3	5	2	3	4	5
Amorph. organic material (AOM)	6	1	2	1	1	0